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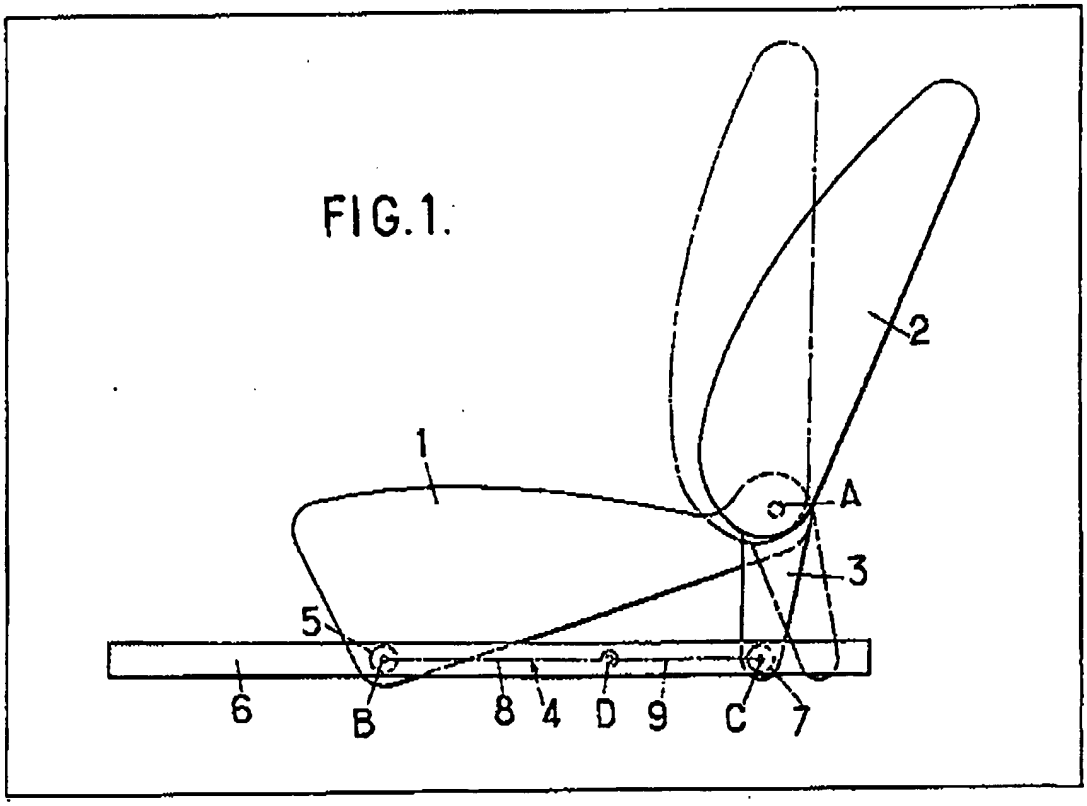
(54) **Improvements to vehicle seat with adjustably inclinable seat-back**

(57) The seat of a two-door vehicle comprises a sitting portion 1 and a seat-back 2 mounted on the sitting portion for pivotal movement about a first horizontal shaft A. The sitting portion is mounted for pivotal movement about a second front horizontal shaft B adapted to slide in a longitudinal slide 6. A mounting 3 extending from the seat-back below shaft A is pivotably mounted about a third rear horizontal shaft C adapted to slide in the slide and a composite linkage 4 connects the two shafts B and C together at D. Means are provided respectively (a) for adjusting the inclination of the seat-back while modifying the longitudinal position of shaft C alone, (b) for adjusting the longitudinal position of the seat by causing this latter to slide as a whole without deformation of the triangle ABC, and (c) for folding the seat-back forwards while freeing shaft B alone by disconnecting the linkage at D.



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(54) Abstract Title
Folding car seat with space for headrest

(57) When folded to give maximum storage, the head rest 16 is accommodated within a recess 14 in the inverted seat 12. A seat 12 forms a linkage that interconnects back rests 18 and seating portions 12, to ease conversion between seating and laid flat, load carrying configurations.

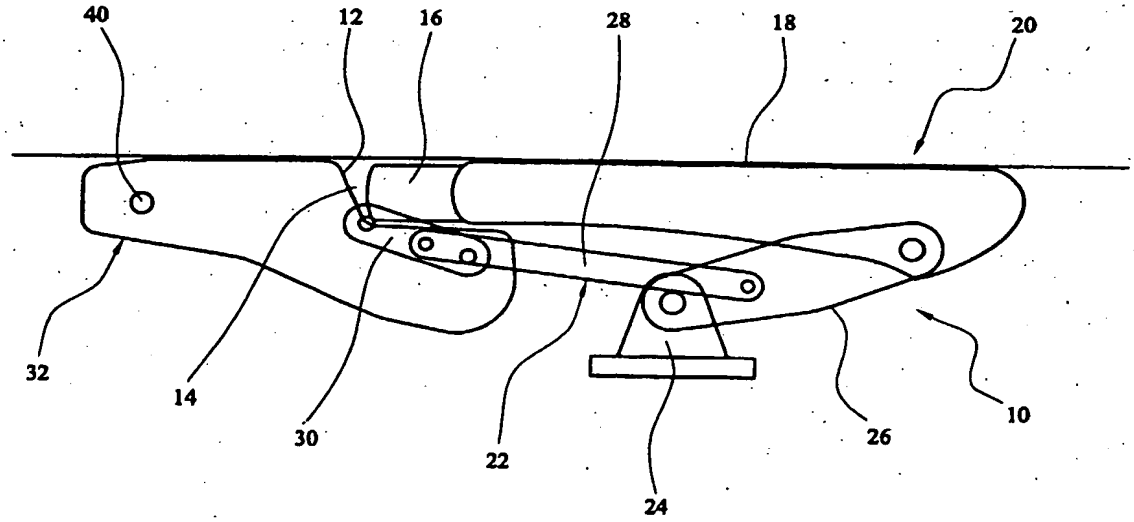

FIG. 3

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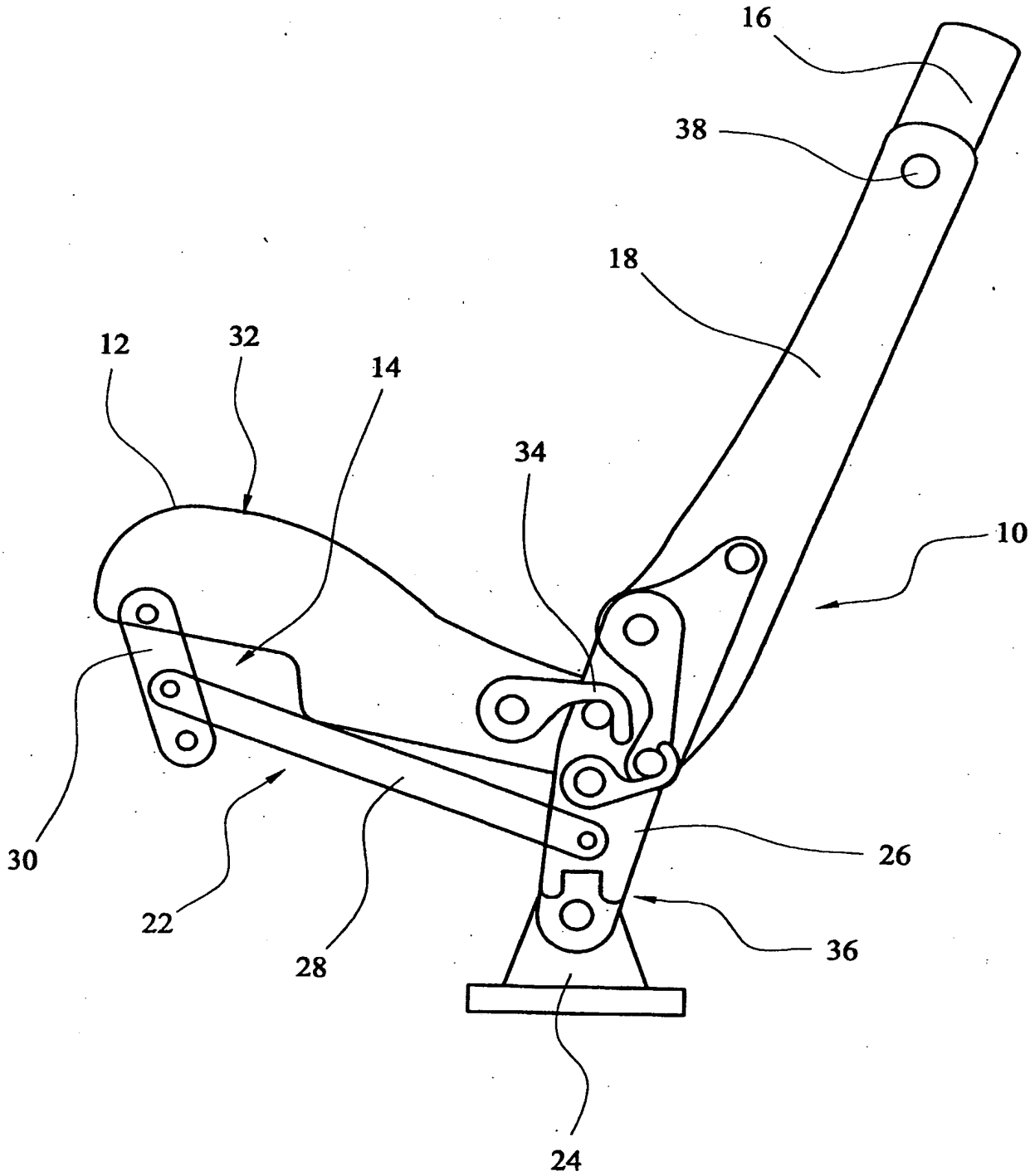

FIG. 1

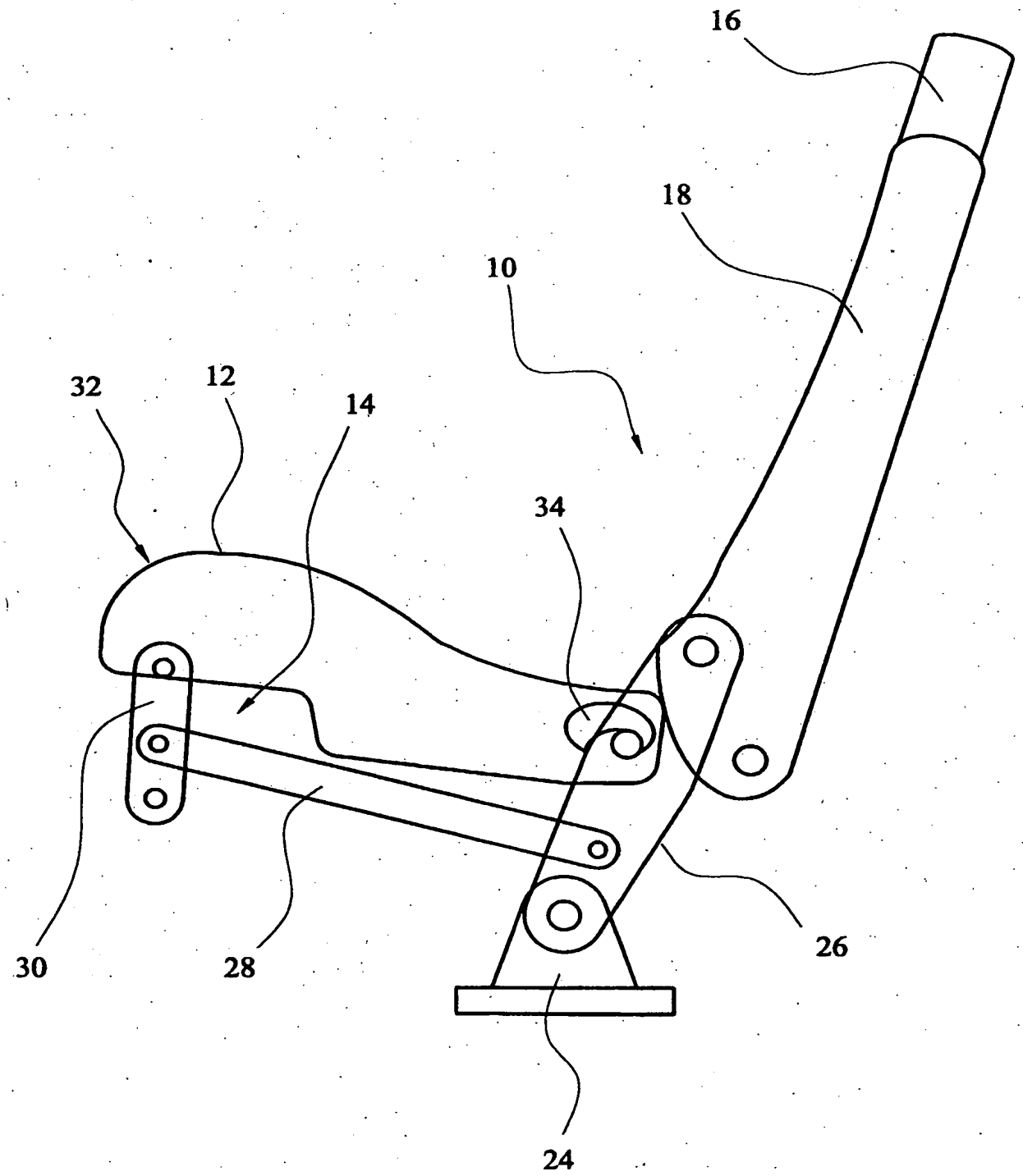

FIG. 2

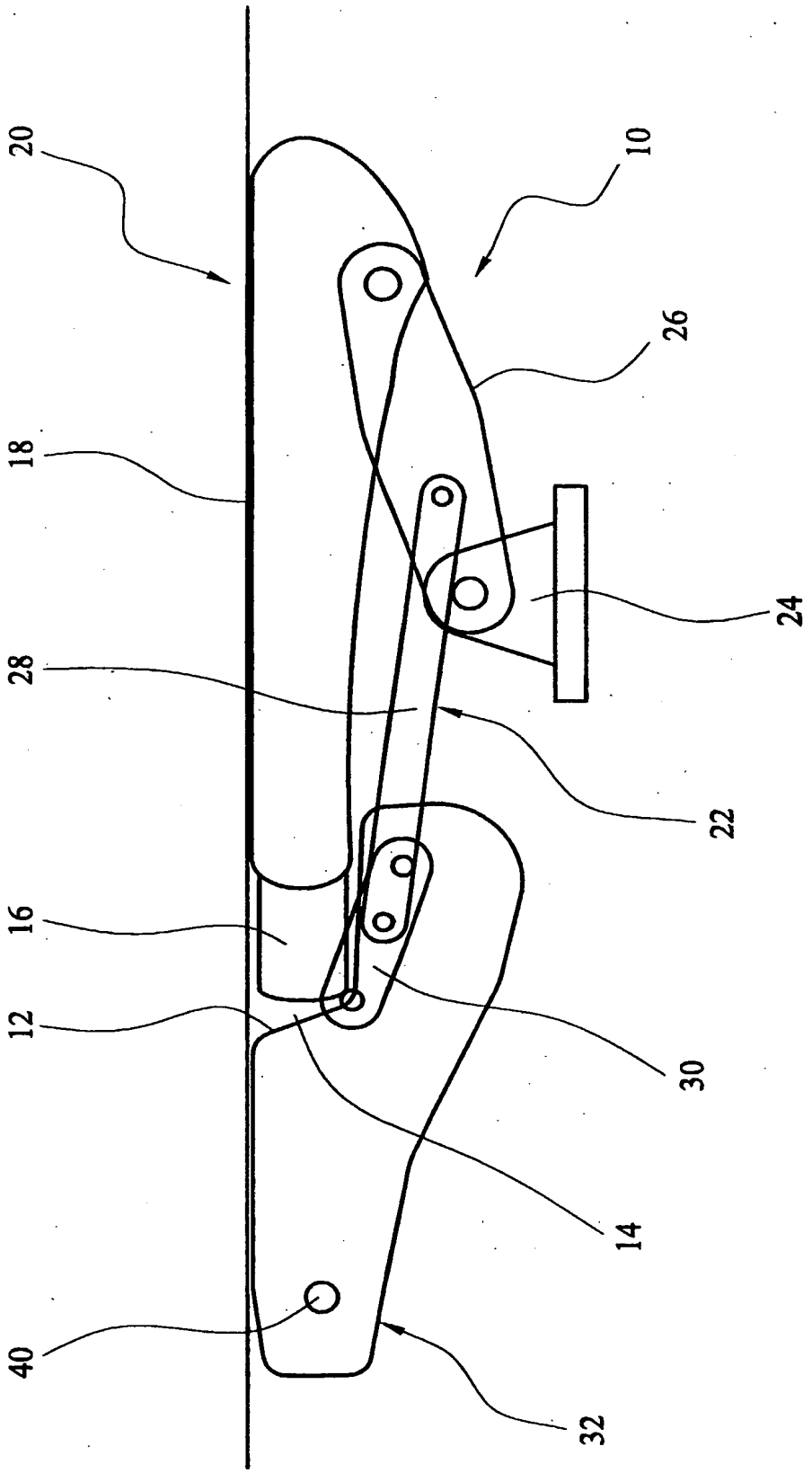

FIG. 3

METHOD AND APPARATUS FOR AUTOMOTIVE SEAT FOLDING

This invention relates to a method and apparatus for automotive seat folding and is particularly but not exclusively concerned with the provision of an automotive rear seat construction in which a facility to provide the usual rear seat folding capability is provided without inconvenience arising from the provision of rear seat head rests.

An aspect of the construction of automotive rear seats for many models of automobile concerns the provision of enhanced storage space for the accommodation of significant volumes of luggage and other goods, particularly where access to the rear storage space is via a tailgate or other wide access facility.

Various arrangements are adopted for enabling the generally horizontal floor portion of the vehicle's rear luggage space to be effectively extended forwards by means of folded portions of the rear seat structures. In some designs the seat portion of the rear seat or seats has to be folded to a forward and somewhat upstanding folded position so as to allow the seat back to adopt a generally horizontal or nearly horizontal attitude for extending the storage space.

In other arrangements the back portion and the seat portion of the rear seat can adopt other attitudes in their folded positions. However, generally speaking the presence of rear seat head rests represents a problem for the provision of a convenient and easily operated rear seat folding mechanism of this kind.

A desirable aspect of the operation of such a seat mechanism is to provide means whereby the folding of the rear seat is simplified so that the number of separate folding operations is reduced if possible to one.

An object of the present invention is to provide an

automotive seat mechanism and a method operating same offering improvements in relation to one or more aspects of the technical issues discussed above and/or improvements generally in relation thereto.

According to the invention there is provided an automotive seat mechanism and a method of operating same as defined in the accompanying claims.

In an embodiment of the invention an automotive seat folding mechanism is adapted to cause simultaneous pivoting movement of the seat back and the seat base or cushion portion so as to produce, in the folded assembly, a generally horizontal structures providing successive and generally contiguous extensions of a load-carrying platform portion at the rear of the vehicle.

This movement is achieved utilising a linkage mechanism of which at least one of the seat portions (or structure associated with that portion) forms a part of the linkage. In this way, the action required to move the seat assembly from its seating position to a stowed position is achieved with a minimum of actuating steps.

A further feature of the described embodiment relates to the provision of means for accommodating at least one headrest, or related structure, in the folded or stowed configuration of the seat assembly. In the embodiment, this is achieved by providing recess means in the obverse or rear side of the seat portion with which the headrest cooperates in its folded configuration. This arrangement is achieved in the embodiment by adoption of a linkage mechanism interconnecting the seat portions and having a geometry such that folding movement of the seat assembly from its generally upright seating configuration towards its generally horizontal stowed configuration causes inversion of the lower or seating or cushion portion of the seat so as to bring into an upwardly-facing disposition the previously (in the cushion's seating attitude) downwardly-facing recess

or the like. By adoption of linkage dimensions and angular geometry appropriate to the precise spacial layout, the seat assembly folds to a lay-flat configuration in which all portions of the folded assembly are snugly interfitting with a minimum of edge-to-edge spacing, whereby the possibilities of stowed goods catching the edges during the stowage operation is minimised.

The provision of a linkage mechanism interconnecting the seat portions to cause adoption of the required attitudes in the stowed configuration has implications for the provision of seat back and seat cushion angular adjustability to meet user comfort and body dimensional requirements. These might be though to be not easily met, due to the inherent function of the linkage mechanism whereby it causes angular adjustment of the seat backrest (for example) to be accompanied by corresponding angular motion of the seat cushion. However, this feature can be accommodated, in the embodiment, by judicious choice of seat geometry so that limited available adjustment can accommodate the reasonable requirements of a substantial majority of vehicle users.

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

Fig 1 shows an automotive seat assembly in a first seating position;

Fig 2 shows the seat assembly in an angularly-adjusted seating position;

Fig 3 shows the seat assembly in a stowed or storage position in which the seat backrest and the seat seating portion cooperate in providing generally horizontal extensions of a vehicle's storage space with headrest means accommodated in recess means.

As shown in the drawings, an automotive seat construction 10 comprises a pivotable seat seating or

cushion portion 12 which is formed with recess means 14 on or in its side which is its lower side during seating use as shown in Figs 1 and 2.

The seat seating portion 12 is adapted to cooperate with or with part of seat headrest means 16 when the seat seating portion 12 is moved to its stowed position as shown in Fig 3, and is inverted, so as to enable a backrest portion 18 of the seat construction to cooperate with the seating portion 12 in providing a generally horizontal extension of a vehicle's storage space without the need for the removal of the headrest means 16.

As shown in Figs 1 to 3, seat construction 10 provides seat seating portion 12 and seat backrest portion 18 interconnected for such movement by a linkage mechanism 22 of which at least one of the seat portions (or structure associated therewith) forms part of the linkage mechanism. In this way, the seat construction is able to move between the seating positions shown in Fig 2 and the stowed or storage position shown in Fig 3 without requiring the user to carry out a multiplicity of operations. Details of this construction will now be further described.

As shown, seat construction 10 comprises a pivotable seat floor mounting 24 on which is mounted a pivotable seat fold link 26 which is movable between its three positions shown in Figs 1, 2 and 3. This link forms one link of linkage mechanism 22. This other links comprise a compensating link 28 and a front link 30 and an upper link 32 which is provided by the seat seating portion 12. Figs 1, 2 and 3 show the details of the geometry of these links in their various positions.

In addition, seat construction 10 comprises a release mechanism 34 for seat seating portion 12 and (see Fig 1) a seat folding facility 36 permitting locking of the seat in its three positions of Figs 1, 2 and 3.

Turning now to use of the seat construction, the seat

seating portion 12 is released from its Fig 1 or Fig 2 position by means of release mechanism or latch 34, and the seat backrest portion 18 is released at 36 by the user operating a control knob 38. Seat fold link 26 moves angularly rearwards and the seat backrest 18 moves angularly forwards to lie over the seat fold link 26 in the position shown in Fig 2. Simultaneously, the compensating link 28 causes front link 30 to pivot rearwards and to cause the seat seating portion or cushion 12 to adopt its inverted position shown in Fig 3 in which the seat headrest means 16 nestles in the recess means 14 which is shaped to match it so that the two together present a flat load platform without any gaps or recesses.

As shown in fig 3, the latch or seat folding facility 36 is released by a front control 40 and is setable in the Fig 1 position or the Fig 2 position, of which the Fig 1 position is suitable for about 5% of users and the Fig 2 position for about 95% of typical users.

Compensating link 28 is free to move within slots (not shown) provided in front link 30 and seat folding link 26. As the seat is moved between the positions shown in Figs 1 and 2, the angle of the seat backrest 18 is set by means of control 38.

CLAIMS:

1. A method of automotive and other seat construction wherein a pivotal seat seating portion is formed with recess means on or in its side which is its lower side during seating use and which seating portion is adapted to cooperate with or with part of seat headrest means when said seating portion is moved to its stowed position and inverted, so as to enable a backrest portion of the seat to cooperate with said seating portion in providing storage space without the need for removal of said headrest means.

2. A method of automotive and other seat construction wherein headrest means associated with a pivotable seat backrest portion is adapted to be accommodated in recess means provided on or in the side of a seating portion of said seat construction, which side is the lower side during seating use.

3. A method of automotive and other seat construction wherein a pivotable seat seating portion is adapted to cooperate with or with part of pivotable seat backrest means when said seating and said backrest portions are moved to their stowed positions and said seating portion is inverted, so as to enable said backrest portion of the seat to cooperate with said seating portion in providing storage space.

4. A method of automotive and other seat construction wherein pivotable seat seating and backrest portions cooperate in their stowed positions to provide generally non-vertical storage space.

5. A method of automotive and other seat construction wherein a pivotable seat seating portion is adapted to cooperate with or with part of pivotable seat backrest means when said seating and said backrest portions are moved to their stowed positions so as to enable said backrest portion of the seat to cooperate with said seating portion in

providing storage space, said seat portions being interconnected for such movement by a linkage mechanism of which at least one of said seat portions (or structure associated therewith) forms part of the linkage mechanism.

6. A method of automotive and other seat construction wherein seat seating and backrest portions are interconnected for movement between seating and stowed positions by a linkage mechanism of which at least one of said seat portions (or structure associated therewith) forms part of the linkage mechanism.

7. An automotive or other seat construction adapted to provide seating functions as defined in any one of claims 1 to 6.

8. An automotive or other seat construction substantially as described herein with reference to the accompanying drawings.

Application No: GB 0108460.7 8/ **Examiner:** Robert Black
Claims searched: 1-3, and 8 and 7 when appendant to claims 1-3 **Date of search:** 21 June 2001

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): A4L LBDA, LBDC, LBDB

Int Cl (Ed.7): B60N 2/36, 2/48

Other: Online: EPODOC; WPI; PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2350057 A	(DAIMLER) see especially figure 2	2, 3 and 7
X	EP 0937605 A1	(BAYERISCHE) see especially figure and WPI abstract 1999-460665	1-3 and 7
X	WO 97/30865 A2	(LEAR) see figures 2-4	1-3 and 7
X	DE 3325927 C	(DAIMLER) see especially figure 5 and WPI abstract 1985-013331	2, 3 and 7

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.